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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/727,216	12/03/2003	Yong-Kyu Jang	8054-27 (LW8079US/WS)	5421

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EXAMINER	
DOLAN, JENNIFER M	
ART UNIT	**PAPER NUMBER**
2813	

DATE MAILED: 06/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/727,216	JANG ET AL.	
	Examiner	Art Unit	
	Jennifer M. Dolan	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-66* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-66* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *7/30/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-6, 9-13, 15, 19-22, 37-42, 45-49, 51, and 55-58 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,864,945 to Fujimori et al.

Regarding claims 1 and 37, Fujimori discloses a liquid crystal display device (figures 2-5) comprising: a first substrate (1) including a thin film transistor (9) formed thereon; a first electrode (2b) formed on the first substrate and electrically connected to the TFT (figures 2-5); a first insulating layer (3) formed on the first substrate including the TFT and the electrode (figures 2-5); a window formed in the first insulating layer (over 2b1 portion of electrode 2b), the window exposing a predetermined region of the first electrode (2b1); a second electrode (2a) provided on the first insulating layer and electrically connected to the first electrode (see figure 5; 2a extends down to contact 2b1; column 8, lines 15-20); a second substrate (11) including a third electrode (7) thereon (figures 1 and 3); a first gap ("db" in figure 5) between the third electrode and the first electrode; and a second gap ("da" in figure 5) between the third electrode

and a surface of the second electrode, wherein the first and second gaps include a liquid crystal layer (4; see figures 2-5).

Regarding claims 2, 3, 38, and 39, Fujimori discloses that the first electrode is a transmission electrode (2b) for transmitting light supplied from an internal source (backlight), and the second electrode is a reflection electrode (2a) for reflecting light from an external source (see column 1, line 60 – column 2, line 8; column 7, lines 33-40).

Regarding claims 4, 5, 40, and 41, Fujimori discloses that the first gap is about twice as long as the second gap (figure 5; column 8, lines 19-38).

Regarding claims 6 and 42, Fujimori discloses that the first insulating layer is made of an organic resin (column 8, lines 10-14).

Regarding claims 9 and 45, Fujimori discloses that the first electrode (2b) is made of ITO, which is a transparent conductive material (column 7, lines 15-19).

Regarding claims 10 and 46, Fujimori discloses that the second electrode includes metal having high reflectivity (column 7, lines 14-16).

Regarding claims 11-13, 15, 47-49, and 51, Fujimori discloses that the device further includes a gate driving circuit section (column 7, lines 5-10; "gate wire" portion supplying the scan signal), where the insulating layer extends over the gate driving circuit section (see column 8, lines 10-37; the first insulating layer and reflection electrode must cover the gate wire lines, because the insulating layer and reflection electrode are only removed in the transmission window portion and not in external reflecting portions), where the first insulating layer has a dielectric constant less than that of the liquid crystal (organic resins have low dielectric constants).

Regarding claims 19-22 and 55-58, Fujimori discloses a color filter layer (5) and a thickness adjusting member (6) formed on the second substrate (figures 5 and 8), wherein the color filter layer is disposed on the thickness adjusting member (figures 5 and 8), and wherein the thickness of a first area of the color filter layer corresponding to the window (figure 5, portion over '2b1') is about twice as thick as a second area of the color filter (portion under 6 in figures 5 or 8) not corresponding to the window.

3. Claims 1-15, 17, 18, 23, 37-51, 53, 54, and 59 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 6,295,109 to Kubo et al.

Regarding claims 1 and 37, Kubo discloses a liquid crystal display (figures 26, 29) comprising: a first substrate (51) including a thin film transistor (52, 56a, 56b) formed thereon; a first electrode (58a) formed on the first substrate (figure 29a) and electrically connected to the TFT (at 66); a first insulating layer (60) formed on the first substrate including the TFT and the first electrode (figure 29a); a window ("region T") formed in the first insulating layer, the window exposing a predetermined region of the first electrode (figure 29a), a second electrode (61) provided on the first insulating layer and electrically connected to the first electrode (through layer 59c at 63 and 66); a second substrate ('counter substrate'; see figure 36 for full LCD structure) including a third electrode ("transmissive electrode" on "CF layer" – see figure 36) formed thereon; a first gap (dt) between a surface of the third electrode and the first electrode (see figures 29a and 36), and a second gap (dr) between a surface of the third electrode and a surface of the second electrode (see figures 29a and 36), where the gaps include a liquid crystal layer ("LC layer" figure 36).

Regarding claims 2, 3, 38, and 39, Kubo discloses that the first electrode is a transmission electrode for transmitting light supplied from an internal source, and the second electrode is a reflection electrode for reflecting external light (column 2, lines 27-35; also see 'Example 2', columns 20-23).

Regarding claims 4, 5, 40, and 41, Kubo discloses that the first gap is about twice as large as the second gap (figure 36).

Regarding claims 6 - 8 and 42-44, Kubo discloses that the first insulating layer is a photosensitive organic resin (see column 49, lines 50-55; column 50, lines 10-20) with a thickness of about 2.5 microns (column 50, lines 10-11).

Regarding claims 9 and 45, Kubo discloses that the first electrode (58a) is formed from ITO (column 49, lines 32-35).

Regarding claims 10 and 46, Kubo discloses that the second electrode is formed from a metal having high reflectivity (column 50, lines 32-36).

Regarding claims 11, 12, 15, 47, 48, and 51, Kubo discloses a gate driving circuit region (gate lines 53) on the substrate and covered by the first insulating layer (gate lines are at the same level as the gates 52; insulating layer is present everywhere except the transmission regions; see figures 24, 29a).

Regarding claims 13 and 49, Kubo discloses that the first insulating layer is an organic resin, which has a lower dielectric constant than the liquid crystal (see column 50, lines 10-20).

Regarding claims 14, 17, 18, 50, 53, and 54, Kubo discloses a second insulating layer (54) formed on the substrate (figure 29a) and extending into the gate driving circuit region (layer 54 is only removed at the transmission window; hence it extends over gate lines 53; also see

column 55, lines 52-60), where the second insulating layer includes a contact hole through which the first electrode is connected to the TFT (item 66 in figure 29a).

Regarding claims 23 and 59, Kubo discloses that the liquid crystal layer is homogeneously aligned to have a tilting angle of about 0 degrees (see columns 20-23).

4. Claims 24-27, 30, 32-35, 60-63, and 65 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,620,655 to Ha et al

Regarding claims 24 and 60, Ha discloses a liquid crystal display device (Figures 1, 2, 7a-7f) comprising: a first substrate (111) including a first thin film transistor (132, 133, 134, etc. fig. 7b); an insulating layer (151) formed on the substrate (figure 7c); a first electrode (119a) formed on the insulating layer and electrically connected to the TFT (through 153; see figure 7c); a second electrode (166, 168) provided on the first electrode (figure 7e), wherein a predetermined portion of the second electrode is removed (at transmission window 155) for exposing a predetermined portion of the first electrode (figure 7F); a second substrate (15) including a third electrode (13) formed thereon (column 1, lines 24-36; it is apparent that the device of figure 7f is only the array substrate for the LCD, and that the color filter substrate would need to be present for the device to function as an LCD); and first and second gaps between the third electrode and the first or second electrodes, respectively, where the gaps include liquid crystal material (see figures 2 and 7F; it is apparent that the liquid crystal is disposed directly on the array substrate of figure 7F, with a color filter substrate disposed on top of the liquid crystal, as in figure 2; also see column 11, lines 50-55).

Regarding claims 25, 26, 61, and 62, Ha discloses that the first electrode is a transmission electrode for transmitting internally supplied light, and the second electrode is a reflection electrode for reflecting externally supplied light (see column 1, line 60 – column 2, line 12; column 10, line 65 – column 11, line 5; columns 30-45).

Regarding claims 27 and 63, Ha discloses that the first electrode at the transmission window is at a much lower level than the second electrode (see figure 7F), which will automatically result in the first gap being larger than the second gap when the two substrates and liquid crystal are assembled, as in figure 2).

Regarding claim 30, Ha discloses that the insulating layer is organic (column 12, lines 48-52).

Regarding claim 32, Ha discloses that the first electrode includes transparent conductive material (column 10, lines 65-67).

Regarding claim 33, Ha discloses that the second electrode includes metal having high reflectivity (column 11, lines 30-50).

Regarding claim 34, Ha discloses a contact hole (153) formed in the insulating layer (figures 7c and 7d), wherein the first electrode is connected to the TFT through the contact hole (figures 7c, 7d).

Regarding claim 35, Ha discloses that the electrode surface of the contact hole is disposed at a level slightly higher than the first electrode, but lower than the second electrode, such that upon assembly of the two substrates, the second gap would be smaller than the third gap, which would be smaller than the first gap (see figures 7f and 2).

Regarding claim 65, Ha discloses a gate driving circuit (right-hand portion of substrate in figure 7f, including gate lines) on the substrate (see figure 7f).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 16 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kubo et al. in view of U.S. Patent Publication No. 2003/0071944 to Baek.

Kubo fails to teach that the gate driving circuit region is formed from amorphous silicon.

Baek discloses that the gate driving circuit region is formed from amorphous silicon (paragraphs 0045-0048).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gate driving circuitry of Kubo, such that the gate line structure includes amorphous silicon, as suggested by Baek. The rationale is as follows: A person having ordinary skill in the art would have been motivated to include layers of amorphous Si in the gate line and gate driving circuitry, because doing so allows for good ohmic contacts between the metal gate lines and the semiconductor material of the TFT, while allowing for a reduction in the number of layer deposition steps and photolithography steps (see Baek, paragraphs 0016, 0020, 0027).

7. Claims 28, 29, 36, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. in view of Kubo et al.

Ha fails to disclose the relative dimensions of the first and second gaps.

Kubo teaches that it is preferable to have a transmission window gap be twice as large as a reflection region gap, in order to match the retardation of the light through the liquid crystal for the transmitted and reflected light (see column 59, lines 10-30, where specific dimensions are selected in order to maximize contrast between 'on' and 'off' states (see Kubo, columns 20-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the gap dimensions of Ha, such that the first gap is twice as large as the second gap, and such that the dimensions are appropriately selected for maximum emission and contrast, as suggested by Kubo. The rationale is as follows: A person having ordinary skill in the art would have been motivated to select dimensions of less than 3.3 microns and less than 1.7 microns for the first and second gaps, respectively, because doing so improves the performance of the transflectance LCD by matching the distance through which the light travels for reflection and transmission modes, as well as optimizes the contrast and brightness of the display (see Kubo, columns 20-23; column 59, lines 10-30). Although Ha and Kubo fail to specifically teach a first gap of less than 3.3 microns and a second gap of less than 1.7 microns, it has been held that "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (1955).

Regarding claim 36, Ha fails to specify the orientation of the liquid crystal layer.

Kubo teaches that the liquid crystal layer is homogeneously aligned with a tilting angle of about 0 degrees (see columns 20-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to specify that the liquid crystal layer of Ha have an orientation of zero degrees, as suggested by Kubo. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide a tilting angle of 0 degrees, because Kubo shows that such an angle conveniently allows for a non-emitting display at no applied voltage, with the brightness of the display increasing with increased applied voltage, such that a grayscale display is formed (see Kubo, columns 20-23).

8. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. in view of U.S. Patent Publication No. 2003/0030768 to Sakamoto et al.

Ha discloses that the first insulating layer may be an acryl resin, but fails to teach that such a layer is photosensitive.

Sakamoto discloses that the insulating layers are photosensitive (paragraphs 0102-0105).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ha such that a photosensitive acryl resin is used, as suggested by Sakamoto. The rationale is as follows: A person having ordinary skill in the art would have been motivated to use a photosensitive insulating layer, because doing so allows for the direct patterning of the layer, such that an additional photoresist layer need not be applied to the device. Further, the usage of a photosensitive resin insulating layer allows for the simple patterning of irregularities

into the surface of the insulating layer, which in turn increases the reflectivity of the reflection electrode formed thereon (see Sakamoto, paragraphs 0102-0105).

9. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ha et al. in view of Baek.

Ha fails to disclose that the gate driving circuit region is formed using amorphous silicon.

Baek discloses that the gate driving circuit region is formed from amorphous silicon (paragraphs 0045-0048).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the gate driving circuitry of Ha, such that the gate line structure includes amorphous silicon, as suggested by Baek. The rationale is as follows: A person having ordinary skill in the art would have been motivated to include layers of amorphous Si in the gate line and gate driving circuitry, because doing so allows for good ohmic contacts between the metal gate lines and the semiconductor material of the TFT, while allowing for a reduction in the number of layer deposition steps and photolithography steps (see Baek, paragraphs 0016, 0020, 0027).

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,720,580 to Kim et al. and U.S. Patent Publication No. 2003/0025859 to Moon et al. disclose transreflective LCD structures applicable to claim 24.

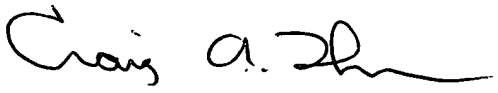
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd



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PRIMARY EXAMINER